REMARKS

Claims 9-16 have been amended above to clarify the subject matter recited therein. Claims 1-8 and 33-36 were previously cancelled without prejudice or disclaimer of the subject matter recited therein. The status identifiers of claims 33-36 in the claim listing above have been updated to reflect the cancellation of these claims. Accordingly, claims 9-32 and 37-40 are currently under consideration in the above-identified application.

Provided above, please find a claim listing indicating the current amendment to claims 9-16, and the status of other claims on separate sheets so as to comply with the requirements set forth in 37 C.F.R. § 1.121. It is respectfully asserted that no new matter has been added. Exemplary support for the amendments to claims 9-16 can be found throughout the originally-filed disclosure. (*See, e.g.,* Substitute Specification, pp. 8-11, paras. [0031]-[0039]).

Reconsideration of the application in view of the above amendments and the following remarks is respectfully requested.

I.   OBJECTIONS TO THE CLAIMS SHOULD BE WITHDRAWN

Claims 33-36 were objected to for having informalities. Specifically, the Examiner notes that although the Remarks section of the previous response states that claims 33-36 have been canceled, that the claim set does not indicate the cancellations. As the Examiner shall ascertain, the status identifiers of claims 33-36 have been updated to reflect the cancellation of claims 33-36 in the previous response.

Accordingly, withdrawal of the objection to claims 33-36 is respectfully requested.

II.   REJECTIONS UNDER 35 U.S.C. § 103(a) SHOULD BE WITHDRAWN

Claims 10-32 and 37-40 stand finally rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Chao, "Ultimate Strength and Failure Mechanism of Resistance Spot Weld Subjected to Tensile, Shear, or Combined Tensile/Shear Loads", Journal of Engineering Materials and Technology, April 2003, Vol. 125, pp. 125-132 ("Chao"), in view of Jiang et al., "Large Cold Plastic Deformation of Metal Matrix Composites Reinforced by SiC Particles", Journal of Materials Science Letters 12, (1993), pp. 1519-1521 ("Jiang"). Claims 9 and 33-36 stand finally rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Chao in view of Jiang, and further in view of Bai et al., "The Role of the Interfacial strength in glass bead filled HDPE", Journal of Materials Science Letters 19, (2000), pp. 1587-1589 ("Bai").

Applicants respectfully assert that Chao, taken alone or combination with Jiang and/or Bai, fails to teach or suggest the subject matter recited in amended independent claims 9-16, and the claims which depend therefrom, for at least the reasons as set forth below.

"To reject claims in an application under Section 103, an examiner must show an unrebutted *prima facie* case of obviousness." *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998). The Supreme Court in *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966), stated:

> Under Section 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at

issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined.

Indeed, to sustain a rejection under 35 U.S.C. § 103(a), there must be some teaching, other than the instant application, to alter the prior art to arrive at the claimed invention. "The problem confronted by the inventor must be considered in determining whether it would have been obvious to combine the references in order to solve the problem." *Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d 675, 679 (Fed. Cir. 1998).

The objective standard for determining obviousness under 35 U.S.C. § 103, as set forth in *Graham v. John Deere, Co.*, 383 U.S. 1 (1966), requires a factual determination to ascertain: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; and (3) the differences between the claimed subject matter and the prior art. Based on these factual inquiries, it must then be determined, as a matter of law, whether or not the claimed subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the alleged invention was made. *Graham*, 383 U.S. at 17. Courts have held that there must be some suggestion, motivation or teaching of the desirability of making the combination claimed by the applicant (the "TSM test"). *See In re Beattie*, 974 F.2d 1309, 1311-12 (Fed. Cir. 1992). This suggestion or motivation may be derived from the prior art itself, including references or disclosures that are known to be of special interest or importance in the field, or from the nature of the problem to be solved. *Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573 (Fed. Cir. 1996).

Although the Supreme Court criticized the Federal Circuit's application of the TSM test, *see KSR International Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741, (2007)

the Court also indicated that the TSM test is not inconsistent with the *Graham* analysis recited in the *Graham v. John Deere* decision. *Id.*; *see In re Translogic Technology, Inc.*, No. 2006-1192, 2007 U.S. App. LEXIS 23969, *21 (October 12, 2007). Further, the Court underscored that "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *KSR*, 127 S. Ct. at 1741. Under the precedent established in *KSR*, however, the presence or absence of a teaching, suggestion, or motivation to make the claimed invention is merely one factor that may be weighed during the obviousness determination. *Id.* Accordingly, the TSM test should be applied from the perspective of a person of ordinary skill in the art and not the patentee, but that person is creative and not an automaton, constrained by a rigid framework. *Id.* at 1742. However, "the reference[s] must be viewed without the benefit of hindsight afforded to the disclosure." *In re Paulsen*, 30 F.3d 1475, 1482 (Fed. Cir. 1994).

The prior art cited in an obviousness determination should create a reasonable expectation, but not an absolute prediction, of success in producing the claimed invention. *In re O'Farrell*, 853 F.2d. 894, 903-04 (Fed. Cir. 1988). Both the suggestion and the expectation of success must be in the prior art, not in applicant's disclosure. *Amgen, Inc. v. Chugai Pharmaceutical Co., Ltd.*, 927 F.2d 1200, 1207 (Fed. Cir. 1991) (citing *In re Dow Chem. Co.*, 837 F.2d 469, 473 (Fed. Cir. 1988)). Further, the implicit and inherent teachings of a prior art reference may be considered under a Section 103 analysis. *See In re Napier*, 55 F.3d 610, 613 (Fed. Cir. 1995).

Secondary considerations such as commercial success, long-felt but unsolved needs, failure of others, and unexpected results, if present, can also be

considered. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538-39 (Fed. Cir. 1983). Although these factors can be considered, they do not control the obviousness conclusion. *Newell Cos. v. Kenney Mfg. Co.*, 864 F.2d 757, 768 (Fed. Cir. 1988).

To establish obviousness, the prior art references must be evaluated as a whole for what they fairly teach and neither the references' general nor specific teachings may be ignored. *Application of Lundsford*, 357 F.2d. 385, 389-90 (CCPA 1966). A reference must be considered for all that it teaches, not just what purportedly points toward the invention but also that which teaches away from the invention. *Ashland Oil, Inc. v. Delta Resins & Refractories*, 776 F.2d. 281, 296 (Fed. Cir. 1985).

As the Examiner shall ascertain, amended independent claim 9 now recites, *inter alia*, a fracture prediction device for a spot welded portion including determining a **fracture limit load (Fcts)** as a fracture strength formula using formula (a) and a **fracture limit load (Ftss)** as a fracture strength formula using formula (b), where formula (a) is given by **Fcts = 2 TS W t sin θ/α** and formula (b) is given by **Ftss = TS W t/α**. Applicants respectfully assert that Chao, taken alone or combination with Jiang and/or Bai, fails to teach or suggest at least these features recited in independent claim 9. Amended independent claim 10 is directed to a fracture prediction device, amended independent claims 11 and 12 are directed to fracture prediction methods, amended independent claims 13 and 14 are directed to computer storage arrangements, and amended independent claims 15 and 16 are directed to computer-accessible medium, and each of amended independent claims 10-16 recite similar subject matter as recited in amended independent claim 9.

It is respectfully submitted that none of Chao, Jiang, or Bai, disclose, teach, or suggest determining either fracture limit load Fcts or Ftss using the recited formulas (a) and (b), respectively, as recited in amended independent claims 9-16. In particular, Chao describes strength testing of samples to develop failure criterion of spot welds. (*See* Chao, p. 125). Chao merely describes predicting the strength of a spot weld using a fracturing stress in conjunction with the equations described in Chao. (*See* Chao, p. 132). However, Chao nowhere discloses, teaches, suggests, or even contemplates determining fracture limit loads Fcts or Ftss using formulas (a) (Fcts = 2 TS W t sin θ/α) and (b) (Ftss = TS W t/α), respectively, as expressly recited in amended independent claims 9-16.

Further, none of Jiang or Bai cure at least such deficiencies of Chao. In particular, Jiang is directed to cold plastic deformation of metal-matrix composites. (*See* Jiang, Title). Jiang describes carrying out "upsetting tests" on various specimens to obtain fracture lines and developing a new processing technique of intermediate solution heat treatment to increase workability. (*See* Jiang, p. 1519). Bai is directed to tensile testing of high density polyethylene and glass beads. (*See* Bai, p. 1587) However, there is no disclosure in Jiang, or Bai regarding a determination of fracture limit loads Fcts or Ftss using formulas (a) (Fcts = 2 TS W t sin θ/α) and (b) (Ftss = TS W t/α), respectively, as expressly recited in amended independent claims 9-16.

Additionally, each of amended independent claims 9-16 recite that the determined fracture limit loads Fcts and Ftss are "based on a stress concentration factor α." The Examiner admits that Chao (in view of Jiang) fails to teach a stress

concentration factor, and attempts to cure this deficiency with Bai. Applicants respectfully disagree that Bai cures at least such additional deficiency.

Indeed, Bai relates to the role of the interfacial strength in glass bead filled high density polyethylene ("HDPE"), and the stresses at which interfacial debonding occurs. Bai does not relate to spot welding at all, much less teach or suggest the determination of fracture limit loads Fcts and Ftss of a spot welded portion based on a stress concentration factor α that is defined by a formula of (tensile strength TS)/(mean tensile stress σo) and/or calculated using a stress concentration factor calculation formula, as explicitly recited in each of amended independent claims 9-16. Each of amended independent claims 9-16 expressly recites that fracture limit loads Fcts and Ftss are determined based on a stress concentration factor α **for a spot welded portion**.

In contrast, Bai is specifically directed to and limited to interfacial strength of high density polyethylene (HDPE) and glass beads. (*See* Bai, pp. 1587-1588). The specimens studied were "glass bead [that] are treated with coupling agents and then extruded with HDPE in a twin-screw extruder," which was injection molded. (*See* Bai, p. 1587). There is nothing in Bai even suggesting or contemplating spot welding, much less teaching or suggesting determination of fracture limit loads Fcts and Ftss of a spot welded portion based on a stress concentration factor α that is defined by a formula of (tensile strength TS)/(mean tensile stress σo) and/or calculated using a stress concentration factor calculation formula, as explicitly recited in amended independent claims 9-16. Bai is only related to the role of the interfacial strength in glass bead filled HDPE, and the stresses at which interfacial debonding occurs. Further, Bai actually

teaches away from Chao and Jiang in expressly and specifically limiting its disclosure to a glass bead and HDPE extruded composite, which has very different properties than spot welded materials.

Therefore, for at least the reasons discussed above, it is respectfully submitted that amended independent claims 9-16, and claims 17-32 and 37-40, are not obvious in view of Chao, Jiang, and Bai. Accordingly, withdrawal of the rejection of claims 9-32 and 37-40 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Chao, Jiang, and Bai is respectfully requested.

III.   CONCLUSION

In light of the foregoing, Applicants respectfully submit that claims 9-32 and 37-40 are in condition for allowance. Prompt consideration, reconsideration and allowance of the present application are therefore earnestly solicited. If any issues remain outstanding, the Examiner is invited to contact the undersigned via the telephone number provided below. The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, associated with this filing to Deposit Account No. 50-2054.

Respectfully submitted,

Date:____May 19, 2011____   By_____
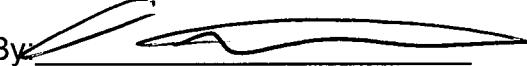
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